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Docket No.: 050103-0528

PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of	:	Customer Number: 49745
Erol GIRT, et al.	:	Confirmation Number: 3152
Application No.: 10/776,222	:	Group Art Unit: 1794
Filed: February 12, 2004	:	Examiner: BERNATZ, Kevin M.
For: Fcc AU-CONTAINING INTERLAYER FOR PERPENDICULAR MEDIA	:	

**REPLY BRIEF PURSUANT TO 37 C.F.R. § 41.41**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The following Remarks are respectfully submitted in response to new issues raised in the Examiner's Answer dated October 15, 2007, pursuant to 37 C.F.R. § 41.41.

**REMARKS**

On page 17 of the Examiner's Answer, the Examiner cited portions of Nakamura et al. and suggested that these portions of Nakamura et al. clearly illustrate that non-magnetic hcp Ti or Ti alloy deposited over a non-magnetic fcc Au layer would be a functional equivalent to a non-magnetic hcp Ru or Ru alloy deposited over a non-magnetic fcc Au layer. It appears the Examiner is basing this determination on Ti and Ru being listed in the same grouping of elements in paragraphs [0032] and [0034]. However, it is well settled that the mere fact that components are members of the same Markush group cannot be relied upon to establish equivalency of these components. *See In re Ruff*, 256 F.2d 590, 599, 118 USPQ 340 (C.C.P.A.

1958). The Examiner has not established that hcp titanium and hcp Ru or Ru alloy layers are known equivalents in perpendicular magnetic recording medium having a non-magnetic interlayer structure, wherein the interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material, as required by the elected species of claim 1, rather the Examiner merely deems it to be so.

One of skill in this art would not consider Ru and Ti to be equivalents for use in a nonmagnetic layer. Further, there are large differences in lattice constants and surface energies. The lattice constants for Ru are  $a = 2.7059$  and  $c = 4.2818$ , and for Ti are  $a = 2.9512$  and  $c = 4.6845$ . The surface energy of Ru is  $2.792 \times 10^{-3}$  N/m, while the surface energy of Ti is  $1.953 \times 10^{-3}$  N/m. To obtain a high degree of crystal orientation in the magnetic layer it is desirable to reduce the lattice mismatch between the magnetic layer and the non-magnetic layer. In view of the large difference in the lattice constants of Ru and Ti, one of ordinary skill in this art would not consider them to be equivalents. In addition, Ti layers are more likely to oxidize during subsequent magnetic media processing in environments containing oxygen than a Ru layer.

Furthermore, Table 1 of Nakamura et al. does not disclose Ti, but rather an alloy of Ti and 10 at % Cr. Thus, the disclosure of Ti/Cr alloy in Nakamura et al. does not correspond to the disclosure of Ti in Lambeth. Furthermore, the data in Table 1 clearly illustrates that the Ti/Cr alloy is not equivalent to Ru.

On pages 19 and 20 of the Examiner's answer, the Examiner cited portions of Abarra et al., Chen et al., and Lal et al. and suggested that in view of these portions of Abarra et al., Chen et al., and Lal et al. one of ordinary skill in this art would have recognized that the Cr-M alloys taught by Abarra et al. and the CrRu alloys taught in the art were functional equivalent alloys for

use as a non-magnetic grain control underlayer. It appears the Examiner is basing this determination on Chen et al. and Lal et al. listing a grouping of alloys which includes alloys disclosed by Abarra et al. However, it is well settled that the mere fact that components are members of the same Markush group cannot be relied upon to establish equivalency of these components. *See In re Ruff*, 256 F.2d 590, 599, 118 USPQ 340 (C.C.P.A. 1958). The Examiner has not established that bcc CrRu layers and bcc Cr-M alloy layers are known equivalents in perpendicular magnetic recording medium having a non-magnetic interlayer structure, wherein the interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material, as required by claim 1, rather the Examiner merely deems it to be so.

Further, because different elements and alloys have different lattice parameters and crystallographic structures and the effect the underlayer has on the overall magnetic recording medium is also dependent on the lattice parameters and crystallographic structure of underlying and overlying layers, it is clear that one of skill in this art would not have recognized that the Cr-M alloy layer of Abarra et al. and the CrRu alloy layers of Chen et al., Lal et al., and Malhotra et al. are known equivalents in the claimed magnetic recording medium.

On pages 21 and 22 of the Examiner's Answer, the Examiner cited portions of Yamamoto et al. and Nakamura et al. and indicated that these portions of Yamamoto et al. and Nakamura et al. provide sufficient guidance to suggest that a non-magnetic hcp intermediate layer comprising Ru is a functional equivalent to the non-magnetic hcp intermediate layer disclosed in Yamamoto et al. and illustrated by a CoCr alloy. It appears the Examiner is basing this determination on Nakamura et al. listing a grouping of elements which includes some elements which are also

disclosed by Yamamoto et al. However, it is well settled that the mere fact that components are members of the same Markush group cannot be relied upon to establish equivalency of these components. *See In re Ruff*, 256 F.2d 590, 599, 118 USPQ 340 (C.C.P.A. 1958). The Examiner has not established that the non-magnetic hcp intermediate layer of Yamamoto et al. and hcp Ru or Ru alloy layers are known equivalents in perpendicular magnetic recording medium having a non-magnetic interlayer structure, wherein the interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material, as required by the elected species of claim 1, rather the Examiner merely deems it to be so.

One of skill in this art would not consider the materials disclosed by Yamamoto et al. and Nakamura et al. as equivalents for use in a nonmagnetic layer because different elements and alloys have different lattice parameters and crystallographic structures and the effect the underlayer has on the overall magnetic recording medium is also dependent on the lattice parameters and crystallographic structure of underlying and overlying layers.

Furthermore, the data in Table 1 of Nakamura et al. clearly illustrates that the Ti/Cr alloy is not equivalent to Ru.

Based upon the arguments submitted supra, Appellants respectfully submit that the Examiner's rejections under 35 U.S.C. §§ 102 and 103 are not legally viable. Appellants, therefore, respectfully solicit the Honorable Board to reverse the Examiner's rejections of claims 1, 13, 14, 17, 18, and 20 as obvious, as evidenced by Lambeth et al. in view of Nakamura et al.; claims 1-5 and 11-20 as obvious, as evidenced by Abarra et al. in view of the knowledge in the art as exemplified by Chen et al. and/or Lal et al. and/or Malhotra et al.; claims 1-5 and 11-20 as

obvious, as evidenced by Abarra et al. in view of Yamamoto et al. in view of the knowledge in the art as exemplified by Chen et al. and/or and or Lal et al. and/or Malhotra et al.; claims 1-5, 11-13, 17, and 20 as obvious, as evidenced by Yamamoto et al. in view of Nakamura et al.; and claims 14-16, 18, and 19 as obvious, as evidenced by Yamamoto et al. in view of Nakamura et al. and further in view of Abarra et al.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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